

From: Sheldrake, Sean
To: ["BAYUK Dana"](#)
Cc: [Lance Peterson \(petersonle@cdmsmith.com\)](#); [Scott Coffey](#)
Subject: RE: Dana question - NW Natural, November 2015 through February 2016 H&C System Hydraulic Data - Evaluation of Transducer Drift and Calibration Data Report
Date: Wednesday, November 30, 2016 9:42:00 AM
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)

Thanks Dana; I'll ask CDM to reply to all on whether that can work. S

Sean Sheldrake, Unit Diving Officer, RPM
EPA Region 10, 1200 Sixth Ave., Suite 900; Mailstop DOC-01
Seattle, WA 98101
206.553.1220 desk
206.225.6528 cell
<http://yosemite.epa.gov/r10/cleanup.nsf/sites/ptldharbor>

FB icon



From: BAYUK Dana [mailto:dana.bayuk@state.or.us]
Sent: Wednesday, November 30, 2016 9:33 AM
To: Sheldrake, Sean <sheldrake.sean@epa.gov>
Cc: Lance Peterson (petersonle@cdmsmith.com) <petersonle@cdmsmith.com>; Scott Coffey <coffeyse@cdmsmith.com>
Subject: FW: Dana question - NW Natural, November 2015 through February 2016 H&C System Hydraulic Data - Evaluation of Transducer Drift and Calibration Data Report

Morning Sean...AQ is requesting to extend the discussion of the transducer data evaluation to 90-minutes. It looks like DEQ can do that at the back end (i.e., 230-4p).

Let me know if that works for you.

Dana

Mr. Dana Bayuk
Cleanup Program Project Manager/Hydrogeologist
Oregon Department of Environmental Quality
Northwest Region
700 NE Multnomah Street, Suite 600
Portland, OR 97232-4100

E-mail: bayuk.dana@deq.state.or.us
Phone: 503-229-5543
FAX: 503-229-6945

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From: Jen Mott [<mailto:jmott@anchorqea.com>]
Sent: Wednesday, November 30, 2016 8:50 AM
To: BAYUK Dana
Cc: Jen Mott; John Edwards
Subject: RE: Dana question - NW Natural, November 2015 through February 2016 H&C System Hydraulic Data - Evaluation of Transducer Drift and Calibration Data Report

Hi Dana,

We would like to add an in person meeting location for the December 5 2:30 pm meeting. Would you prefer to meet at DEQ or at Anchor QEA's downtown Portland office?

Also, can we adjust the meeting to 90 minutes instead of an hour? Our preference is to add 30 minutes at the beginning of the meeting but could add 30 minutes to the end if needed.

Thank you for your consideration.

Thank you,
Jen Mott ☺
Anchor QEA, LLC
jmott@anchorqea.com
421 SW Sixth Avenue, Suite 750
Portland, OR 97204
503-972-5014

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From: BAYUK Dana [<mailto:dana.bayuk@state.or.us>]
Sent: Tuesday, November 29, 2016 12:17 PM
To: Jen Mott <jmott@anchorqea.com>; BAYUK Dana <dana.bayuk@state.or.us>; John Edwards <jedwards@anchorqea.com>
Cc: Scott Coffey <coffeyse@cdmsmith.com> <coffeyse@cdmsmith.com>; LARSEN Henning <henning.larsen@state.or.us>; Lance Peterson (petersonle@cdmsmith.com) <petersonle@cdmsmith.com>; Sean Sheldrake <sheldrake.sean@epa.gov>
Subject: RE: Dana question - NW Natural, November 2015 through February 2016 H&C System Hydraulic Data - Evaluation of Transducer Drift and Calibration Data Report
Importance: High

Apologies Jen...quick update, DEQ is not available this Thursday (12/1) from 2 to 3 pm.

We remain available as follows:

Thursday, 12/1

From 9 to 10 am

Monday, 12/5

From 2:30 to 3:30 pm

Sorry for any inconvenience this may have caused.

Dana

Mr. Dana Bayuk
Cleanup Program Project Manager/Hydrogeologist
Oregon Department of Environmental Quality
Northwest Region
700 NE Multnomah Street, Suite 600
Portland, OR 97232-4100

E-mail: bayuk.dana@deq.state.or.us
Phone: 503-229-5543
FAX: 503-229-6945

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From: Jen Mott [<mailto:jmott@anchorqea.com>]
Sent: Tuesday, November 29, 2016 9:42 AM
To: BAYUK Dana; John Edwards
Cc: Scott Coffey <coffeyse@cdmsmith.com>; LARSEN Henning; Lance Peterson (peterstone@cdmsmith.com); Sean Sheldrake; Jen Mott
Subject: RE: Dana question - NW Natural, November 2015 through February 2016 H&C System Hydraulic Data - Evaluation of Transducer Drift and Calibration Data Report

Thank you, Dana.

I will send a meeting notice shortly and work with John to provide you the requested information prior to the call.

Thank you,
Jen Mott ☺
Anchor QEA, LLC
jmott@anchorqea.com
421 SW Sixth Avenue, Suite 750
Portland, OR 97204
503-972-5014

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From: BAYUK Dana [<mailto:dana.bayuk@state.or.us>]
Sent: Tuesday, November 29, 2016 9:09 AM

To: Jen Mott <jmott@anchorgea.com>; John Edwards <jedwards@anchorgea.com>
Cc: Scott Coffey <coffeyse@cdmsmith.com> <coffeyse@cdmsmith.com>; LARSEN Henning <henning.larsen@state.or.us>; Lance Peterson (petersonle@cdmsmith.com) <petersonle@cdmsmith.com>; Sean Sheldrake <sheldrake.sean@epa.gov>
Subject: RE: Dana question - NW Natural, November 2015 through February 2016 H&C System Hydraulic Data - Evaluation of Transducer Drift and Calibration Data Report

Hello there.

EPA and DEQ are available for a 1-hour call to discuss the transducer data evaluation on the following dates/times.

Thursday, 12/1

From 9 to 10 am

From 2 to 3 pm

Monday, 12/5

From 2:30 to 3:30 pm

John's e-mail indicates Anchor has questions about the details of DEQ's findings. I'd ask that Anchor provide the questions prior to the call so we can be prepared for the discussion.

Thanks much,

Dana

Mr. Dana Bayuk
Cleanup Program Project Manager/Hydrogeologist
Oregon Department of Environmental Quality
Northwest Region
700 NE Multnomah Street, Suite 600
Portland, OR 97232-4100

E-mail: bayuk.dana@deq.state.or.us
Phone: 503-229-5543
FAX: 503-229-6945

Please visit our website at <http://www.oregon.gov/DEQ/>



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From: Jen Mott [<mailto:jmott@anchorgea.com>]
Sent: Monday, November 28, 2016 8:07 AM
To: 'BAYUK Dana'
Cc: Jen Mott
Subject: RE: Dana question - NW Natural, November 2015 through February 2016 H&C System Hydraulic Data - Evaluation of Transducer Drift and Calibration Data Report

Hi Dana,

Per John Edwards' email below, I would like to schedule a one hour conference call. Is your team available to attend a call on the following dates:

Thursday, 12/1

From 9 to 10 am

Between 11 am and 1 pm

From 2 to 3 pm

Friday, 12/2

From 11 am to 12 pm

Between 1:30 and 4:00 pm

Monday, 12/5

From 8 to 9 am

From 2:30 to 3:30 pm

When you reply, can you please confirm that you would like all members of the DEQ team listed on the email chain below to be invited to the call?

Thank you! ☺

Thank you,
Jen Mott ☺
Anchor QEA, LLC
jmott@anchorqea.com
421 SW Sixth Avenue, Suite 750
Portland, OR 97204
503-972-5014

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From: John Edwards

Sent: Wednesday, November 23, 2016 1:57 PM

To: BAYUK Dana <dana.bayuk@state.or.us>

Cc: Ben Hung <bhung@anchorqea.com>; Ben Johnson <bjohnson@anchorqea.com>; Scott Coffey <coffeyse@cdmsmith.com> <coffeyse@cdmsmith.com>; LARSEN Henning <henning.larsen@state.or.us>; Ilene Munk Gaekwad (imunk@foleymansfield.com) <imunk@foleymansfield.com>; Jen Mott <jmott@anchorqea.com>; James Peale <jpeale@maulfoster.com>; John Renda <jrenda@anchorqea.com>; Katie Atkins <katkins@anchorqea.com>; Kelly Titkemeier (ktitkemeier@maulfoster.com) <ktitkemeier@maulfoster.com>; Mary Benzinger (mbenzinger@maulfoster.com) <mbenzinger@maulfoster.com>; 'Mike Murray' <mmurray@maulfoster.com>; Madi Novak <mnovak@maulfoster.com>; Mike Riley <mriley@anchorqea.com>; Matt Wilson <mwilson@anchorqea.com>; Myron Burr (myron.burr@siltronic.com) <myron.burr@siltronic.com>; Patty Dost <pdost@pearllegalgroup.com>; Lance Peterson (peterstone@cdmsmith.com)

<peterstonle@cdmsmith.com>; Pradeep Mugunthan <pmugunthan@anchoragea.com>; Bob Wyatt <rjw@nwnatural.com>; Rob Ede <robe@hahnenv.com>; Rana Uhl <ruhl@anchoragea.com>; Sean Sheldrake <sheldrake.sean@epa.gov>; John Edwards <jedwards@anchoragea.com>

Subject: RE: NW Natural, November 2015 through February 2016 H&C System Hydraulic Data - Evaluation of Transducer Drift and Calibration Data Report

Dana. Thanks for the detailed review of the transducer data report. We have some questions about the details of DEQ's findings and recommendations and would like to schedule a conference call after Thanksgiving to discuss. We agree that a three month period to assess the effects of DEQ's revised transducer calibration protocol is appropriate and would provide valuable information.

Jen will be contacting DEQ to schedule a conference call.

Have a relaxing holiday.

John

John E. Edwards, RG, CEG

ANCHOR QEA, LLC

6364 Toohey Road
Bozeman, MT 59715

Main 406-586-8811
Cell 406-581-0877

ANCHOR QEA, LLC

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From: BAYUK Dana [<mailto:dana.bayuk@state.or.us>]

Sent: Wednesday, November 23, 2016 2:30 PM

To: John Edwards <jedwards@anchoragea.com>

Cc: Ben Hung <bhung@anchoragea.com>; Ben Johnson <bjohnson@anchoragea.com>; Scott Coffey <coffeyse@cdmsmith.com> <coffeyse@cdmsmith.com>; LARSEN Henning <henning.larsen@state.or.us>; Ilene Munk Gaekwad (imunk@foleymansfield.com) <imunk@foleymansfield.com>; Jen Mott <jmott@anchoragea.com>; James Peale <jpeale@maulfoster.com>; John Renda <jrenda@anchoragea.com>; Katie Atkins <katkins@anchoragea.com>; Kelly Titkemeier (ktitkemeier@maulfoster.com) <ktitkemeier@maulfoster.com>; Mary Benzinger (mbenzinger@maulfoster.com) <mbenzinger@maulfoster.com>; 'Mike Murray' <mmurray@maulfoster.com>; Madi Novak <mnovak@maulfoster.com>; Mike Riley <mriley@anchoragea.com>; Matt Wilson <mwilson@anchoragea.com>; Myron Burr (myron.burr@siltronic.com) <myron.burr@siltronic.com>; Patty Dost <pdost@pearllegalgroup.com>; Lance Peterson (peterstonle@cdmsmith.com) <peterstonle@cdmsmith.com>; Pradeep Mugunthan <pmugunthan@anchoragea.com>; Bob Wyatt

<rjw@nwnatural.com>; Rob Ede <robe@hahnenv.com>; Rana Uhl <ruhl@anchorgea.com>; Sean Sheldrake <sheldrake.sean@epa.gov>

Subject: RE: NW Natural, November 2015 through February 2016 H&C System Hydraulic Data - Evaluation of Transducer Drift and Calibration Data Report

Hello John.

DEQ reviewed the "Evaluation of Transducer Drift and Calibration Data, NW Natural Gasco Site" dated August 5, 2016 (Transducer Data Evaluation). The Transducer Data Evaluation presents NW Natural's evaluation of potential error associated with transducer data collected at monitoring wells and piezometers in the HC&C system monitoring network during the commissioning period (May 2015 through May 2016). Anchor QEA, LLC (Anchor) prepared the Transducer Data Evaluation for NW Natural.

The primary purpose of the Transducer Data Evaluation is to determine whether an adjustment should be made to the performance criterion being used to evaluate whether the HC&C system is achieving and maintaining hydraulic control and containment of groundwater in the Upper Alluvium WBZ, Lower Alluvium WBZ, and the Deep Lower Alluvium WBZ. The current performance criterion is to maintain water level elevations in monitoring wells and piezometers more than 0.05-feet below those of the Willamette River.

Differences between monthly manual water level measurements and transducer data form the basis of the evaluation. As indicated in the Transducer Data Evaluation, Anchor compiled and evaluated the differences by taking the arithmetic average of the monthly difference between manual measurements and transducer data for each location. Using this approach Anchor concludes the current criterion of 0.05-feet does not need adjustment.

DEQ further evaluated the water level data differences compiled by Anchor (see table attached). Based on our review and analysis of the data, DEQ does not approve the Transducer Data Evaluation. Our review and analysis determined the following:

- Conclusions regarding the error between manual measurements and transducer data should be based on the average sum of the total absolute error associated with groundwater and river stage water level measurements.
- Using the average sum of the total absolute error, the performance criterion for determining hydraulic control and containment should be increased from 0.05-feet to 0.1-feet (i.e., the water level elevations in each monitoring well and piezometer should be a minimum of 0.1-feet lower than the river to account for total absolute error).
- The highest priority measuring points for checking, confirming, and maintaining data accuracy include (in order of importance):
 - The two transducers in the river as they are the basis for HC&C system operations overall and measurement errors here are propagated throughout water level monitoring network;
 - All control wells given measurement errors influence the capacity of the HC&C system to achieve and/or maintain hydraulic control and containment in the vicinity of nearby extraction wells;

- Monitoring well and piezometer locations that do not consistently meet the revised criterion of 0.1-feet (see red-highlighted locations in the "Avg. Sum Error" column of the attachment) and/or installations of important to evaluating HC&C system performance (e.g., Deep Lower Alluvium WBZ monitoring wells, WS-8-59, WS-12-125).
- Monthly manual water level measurements are inadequate to monitor, evaluate, and/or rectify in a timely manner, errors between transducer and manual measurements. Consequently, for at least three consecutive months NW Natural should increase the frequency of manual measurements as follows:
 - Twice per week (semi-weekly) at both river stilling wells;
 - Weekly at all control wells; and
 - Every other week (bi-weekly) at all installations that do not consistently meet the performance criterion of 0.1-feet.

Regarding the remaining monitoring wells and piezometers in the network, NW Natural should continue measuring water levels monthly.

DEQ also recommends that the procedures being used to collect manual measurements be reviewed and modified to ensure data accuracy. Some of these best practice procedures include, but are not limited to:

- Synchronizing the field time when manual water level measurements are made with the transducer clock and/or PLC;
- Noting, recording, and using consistent water level meter sensitivity settings (many water level probes have this setting) when collecting the synoptic manual water level measurements; and
- Collecting and recording duplicate water level measurements at each sensor location to ensure measurements are consistent, or not being influenced by external factors.

The water level data collected according to this e-mail will be used to further evaluate differences between manual and transducer measurements and make adjustments to the water level monitoring program if appropriate. Furthermore, the revised protocols for measuring groundwater and river water levels should be fully incorporated into the HC&C system performance monitoring plan.

Please feel to contact me if you have questions or would like to arrange a date and time if you'd like to discuss this e-mail and the attachment.

Dana

Mr. Dana Bayuk
Cleanup Program Project Manager/Hydrogeologist
Oregon Department of Environmental Quality
Northwest Region
700 NE Multnomah Street, Suite 600
Portland, OR 97232-4100

E-mail: bayuk.dana@deq.state.or.us
Phone: 503-229-5543
FAX: 503-229-6945

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-----Original Message-----

From: Jen Mott [<mailto:jmott@anchoragea.com>]

Sent: Friday, August 05, 2016 7:06 AM

To: BAYUK Dana

Cc: Bob Wyatt; Patty Dost; Ben Hung; John Edwards; Pradeep Mugunthan; Mike Riley; Ben Johnson; Matt Wilson; Rob Ede; Sean Sheldrake; Lance Peterson (peterstone@cdmsmith.com); Scott Coffey <coffeyse@cdmsmith.com>; LARSEN Henning; John Renda; Jen Mott; Rana Uhl; Katie Atkins; James Peale; Kelly Titkemeier (ktitkemeier@maulfoster.com); Madi Novak; Mary Benzinger (mbenzinger@maulfoster.com); 'Mike Murray'; Myron Burr (myron.burr@siltronic.com); Ilene Munk Gaekwad (imunk@foleymansfield.com)
Subject: RE: NW Natural, November 2015 through February 2016 H&C System Hydraulic Data - Evaluation of Transducer Drift and Calibration Data Report

Dana,

The attached report, Evaluation of Transducer Drift and Calibration Data, was prepared in response to your June 3, 2016 email request for NW Natural to further evaluate the potential for transducer drift to influence data collection and use.

Please contact John Edwards with any questions or to discuss the report.

Thank you,

Jen Mott ☺

Anchor QEA, LLC

jmott@anchoragea.com

421 SW Sixth Avenue, Suite 750

Portland, OR 97204

503-972-5014

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-----Original Message-----

From: BAYUK Dana [<mailto:BAYUK.Dana@deq.state.or.us>]

Sent: Friday, June 03, 2016 4:34 PM

To: John Renda <jrenda@anchorqea.com>

Cc: Bob Wyatt <rjw@nwnatural.com>; Patty Dost <pdost@pearllegalgroup.com>; Ben Hung <bhung@anchorqea.com>; John Edwards <jedwards@anchorqea.com>; Pradeep Mugunthan <pmugunthan@anchorqea.com>; Mike Riley <mriley@anchorqea.com>; Jen Mott <jmott@anchorqea.com>; Ben Johnson <bjohnson@anchorqea.com>; Matt Wilson <mwilson@anchorqea.com>; Rob Ede <robe@hahnenv.com>; Myron Burr (Myron.Burr@siltronic.com) <Myron.Burr@siltronic.com>; Ilene M. Munk (imunk@foleymansfield.com) <imunk@foleymansfield.com>; Madi Novak (mnovak@maulfoster.com) <mnovak@maulfoster.com>; James Peale (jpeale@maulfoster.com) <jpeale@maulfoster.com>; Mike Murray <mmurray@maulfoster.com>; Sean Sheldrake <sheldrake.sean@epa.gov>; Lance Peterson (peterstone@cdmsmith.com) <peterstone@cdmsmith.com>; Scott Coffey <coffeyse@cdmsmith.com> <CoffeySE@cdmsmith.com>; LARSEN Henning <LARSEN.Henning@deq.state.or.us>

Subject: NW Natural, November 2015 through February 2016 H&C System Hydraulic Data

Good afternoon John.

DEQ reviewed the HC&C system hydraulic data packages for the months of November 2015 through February 2016. Anchor QEA, LLC prepared the four monthly data packages for NW Natural and made the data available for DEQ and EPA to download from Anchor's FTP site, or transmitted the data via e-mail.

This e-mail provides our comments on the hydraulic data packages, and acknowledges that the compilation, presentation, and reporting of these data packages were completed consistent with the schedule DEQ approved by e-mail on October 6, 2015. Besides DEQ, EPA reviewed the HC&C system hydraulic data packages. EPA's comments have been incorporated into the attachment.

For clarification, the comments provided in this e-mail supplement DEQ and EPA comments e-mailed on February 25, 2016. Besides providing DEQ/EPA observations on HC&C system performance, the February 25th comments identified the need for NW Natural to further evaluate the potential for transducer drift to influence data collection and use. NW Natural, Siltronic, EPA, and DEQ discussed transducer drift during a conference call on April 28, 2016. DEQ currently understands that NW Natural is developing a technical approach for further analyzing the potential for transducer drift to influence hydraulic data presentations and interpretations, as well as NW Natural's conclusions regarding HC&C system performance.

Except as indicated in the attachment, DEQ is not requesting NW Natural to provide written responses to the comments. The comments provide our observations regarding hydraulic data and data trends, and are for NW Natural's information, consideration, and use in monitoring the performance and operation of the HC&C system, and for future reporting.

DEQ acknowledges and appreciates NW Natural monthly compilation and preparation of the HC&C system hydraulic data packages.

Hope you have a good weekend and please feel free to contact me with questions regarding this e-mail.

Dana

Mr. Dana Bayuk

Cleanup Program Project Manager/Hydrogeologist Oregon Department of
Environmental Quality Northwest Region
700 NE Multnomah Street, Suite 600
Portland, OR 97232-4100

E-mail:

bayuk.dana@deq.state.or.us<<https://deqmail.deq.state.or.us/owa/redir.aspx?C=xpW59Hf5PUaZQh14CmQiIBhMMhcOKtAICv8HjAWBmf41qjKlUXf-S2Jkwgyvoh92WdxoWiGazVI.&URL=mailto%3abayuk.dana%40deq.state.or.us>>

Phone: 503-229-5543

FAX: 503-229-6899

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